

SUPERIOR COURT OF THE STATE OF CALIFORNIA
FOR THE COUNTY OF LOS ANGELES

TINA HERFORD and DOUGLAS HERFORD,

Plaintiffs

vs Case No. BC646315

AT&T CORP., a subsidiary of AT&T INC.

and its subsidiary PACIFIC BELL

TELEPHONE COMPANY, et al.,

Defendants.

VIDEO DEPOSITION OF DR. JOHN HOPKINS

Day 2

Wednesday, August 16, 2017

at: 10:03 am

Taken at:

Shook Hardy & Bacon LLP

25 Old Broad Street

London EC2N 1HQ

United Kingdom

Court Reporter:

DEIRDRA JORDAN

Job No. 2657979

SUPERIOR COURT OF NEW JERSEY
LAW DIVISION - MIDDLESEX COUNTY

DAVID CHARLES ETHERIDGE and
DARLENE PASTORE ETHERIDGE,
Plaintiffs,
vs

Docket No.
MID-L-0932-17 AS

BRENNTAG NORTH AMERICA, INC.
(sued individually and as
successor-in-interest to
MINERAL PIGMENT SOLUTIONS, INC.
and as successor-in-interest to
WHITTAKER CLARK & DANIELS, INC.)
et al.,

Defendants.

SUPERIOR COURT OF NEW JERSEY
LAW DIVISION - MIDDLESEX COUNTY

RONALD MARTIN TEUSCHER and
SHANNON TEUSCHER,

Plaintiffs,

vs

Docket No.

MID-L-7249-16 AS

BRENNTAG NORTH AMERICA, INC.
(sued individually and as
successor-in-interest to
MINERAL PIGMENT SOLUTIONS, INC.
and as successor-in-interest to
WHITTAKER CLARK & DANIELS, INC.)
et al.,

Defendants.

SUPERIOR COURT OF NEW JERSEY
LAW DIVISION - MIDDLESEX COUNTY

IRMA VERDOLOTTI,

Plaintiff,

vs

Docket No.

MID-L-5973-16 AS

BRENNTAG NORTH AMERICA, INC.

(sued individually and as
successor-in-interest to

MINERAL PIGMENT SOLUTIONS, INC.

and as successor-in-interest to

WHITTAKER CLARK & DANIELS, INC.)

et al.,

Defendants.

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(For Shulton, Inc., sued individually and as

successor to The Shulton Group and/or

Shulton, Inc.; The Procter & Gamble Company,

sued as successor-in-interest to The Shulton

Group and/or Shulton, Inc.; and Wyeth Holdings

LLC, f/k/a Wyeth Holdings Corporation, f/k/a

American Cyanamid Company, sued individually

and as successor-in-interest to The Shulton

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21
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23
24 DR. DAVID S. EGILMAN
25 VIDEOGRAPHER: LINDA FLEET

1 (On the record at 10:03 am)

2 VIDEOGRAPHER: We are on the record. This is
3 the continued deposition of John Hopkins.

4 The date today is August 16 and the time is
5 10:03.

6 EXAMINATION:

7 BY MR PANATIER:

8 Q Okay. Good morning, sir.

9 A Good morning.

10 Q All right.

11 So yesterday where we left off Johnson &
12 Johnson was sending samples of their talc to Fred
13 Pooley so he could work on a procedure to try to remove
14 the tremolite.

15 Do you recall that?

16 A You did show me those papers, yes.

17 Q Okay. All right.

18 Other than broad intellectual or scientific
19 curiosity and whether or not they could remove
20 tremolite, can you think of any other reason why they
21 would want to be removing the tremolite from their
22 talc?

23 A I don't know. It was obviously a research
24 project that someone decided they would like to look
25 at, but I -- you know, I couldn't comment beyond that

1 on something that happened 40-odd years ago.

2 Q It is possible that they wanted the tremolite
3 removed because they perceived it to be dangerous?

4 A It is possible.

5 But, again, I cannot speak for someone's
6 thought processes from 40-odd years ago.

7 Q All right. This is Exhibit 67.

8 (Exhibit 67 marked for identification)

9 Now, as context, sir, before we started today
10 I had you just review Dr Lewin's report to the FDA
11 about the 195 samples that he had tested in the early
12 '70s and '72; do you recall that?

13 A You did show me a publication by Dr Lewin dated
14 1972 reviewing talc samples.

15 Q Okay.

16 One of those samples was sample 84. That was
17 Johnson & Johnson Shower to Shower; correct?

18 A That was, yes.

19 Q Okay.

20 What I've handed you now is, you can see this
21 is a FDA publication. You can see under Description of
22 the Work, it says:

23 "The 200 commercial cosmetic talc samples
24 evaluated by Dr Lewin will be tested for asbestos by
25 refractory optical microscopy".

1 Do you see that on the first page?

2 A Yes, that's what it says.

3 Q And if you turn to, let's see, the first
4 flag -- there should be a flag on there ...

5 A Yes.

6 Q You can see -- and I'm sorry, actually, go back
7 one page for some context. There you go.

8 You can see at the bottom it's dated 1.3.74;
9 right?

10 A Yes.

11 Q And Project -- Program Manager's signature is
12 Heinz Eiermann, who we know to be with the Division of
13 Cosmetics in the FDA; correct?

14 A Correct, yes.

15 Q All right.

16 And then at the top the project title is
17 Asbestos and Other Contaminants in Talcs; right?

18 A Yes.

19 Q Okay.

20 If you turn the page, you can see I've
21 highlighted there that, and you can see at the top:

22 "Examination of talc samples by optical
23 microscopy according to the method published in the
24 Federal Register ... is proceeding. As of 12/21/73,
25 samples (Lewin's identification) ..."

1 So we're clear those are Lewin's numbers, and
2 he lists off the numbers:

3 "... 29, 58, 60, 84, 87, 131, 133, 134, 135,
4 136, 137 and 138 were analyzed for mineral content.
5 All contained large quantities of talc, small amounts
6 of carbonates, and minor amounts of hematite, quartz
7 and diatomaceous earth. Sample #84 contained 107
8 fibers of tremolite/actinolite per mg".

9 Did I read that right?

10 A You read that correctly, yes.

11 Q Okay.

12 So let's do a little basic math, you and I.
13 Let me go ahead and go up to the ...

14 All right. So he says as of, so we'll put
15 that date, 12.21.73.

16 This is the FDA and they find in Johnson &
17 Johnson Shower to Shower -- they find 107 fibers of
18 tremolite per milligram.

19 Is that correct?

20 A That is Dr Lewin's summary, yes.

21 Q That's not Dr Lewin's summary. This is the
22 FDA's re-examination of Lewin's samples.

23 Do you understand that?

24 A Okay. That's not clear from here.

25 Q Okay.

1 A So who actually did the examination?

2 Q Okay.

3 You can see here on the previous page at the
4 bottom, Project Manager's signature; right?

5 A Yeah.

6 Q And that's John Stuart, but here Ronald Yates
7 signed it; correct?

8 A Okay, yeah.

9 Q Okay?

10 A Yeah.

11 Q And if you turn to the page that is flagged:

12 "Examination of talc samples by optical
13 microscopy according to the Federal Register ... is
14 proceeding".

15 A Yeah.

16 Q This is in 1973 and '74; correct?

17 A Correct, yes.

18 Q Lewin has already done his testing.

19 You're aware of that; correct?

20 A Yeah, sure.

21 Q Okay, and they're using Lewin's identification
22 numbers; right?

23 A Oh, got you. Okay.

24 Q So they're evaluating Lewin's report; right?

25 A Okay.

1 Q And Lewin's samples.

2 And what the FDA finds is 107 fibers of
3 tremolite per milligram; right?

4 A That's what it says.

5 Q Okay.

6 Now, how many milligrams are there in a gram?

7 A A thousand.

8 Q One thousand. So if we want to know how many
9 fibers the FDA found per gram of Johnson & Johnson's
10 Shower to Shower, we just multiply 107 by a thousand;
11 right?

12 A Mmm hmm, yes.

13 Q And that would give us 107,000 tremolite fibers
14 per gram; correct?

15 A Well, it says tremolite/actinolite.

16 Q Okay. Tremolite/actinolite. That's fair, and
17 I'll write "/actinolite" per gram.

18 Okay. So you can set that aside.

19 The next Exhibit will be Exhibit 68.

20 (Exhibit 68 marked for identification)

21 Let me take that one back, I'm sorry, because
22 I divided these into two. Let me give you a new one.
23 It's the full copy.

24 All right. Here you go, sir. Sorry.

25 A Thank you.

1 Q All right.

2 So this one if you turn -- you actually have
3 to turn to the last page to see what this is, where you
4 see the Johnson & Johnson, and I'm sorry, turn to the
5 page at the bottom marked 8248.

6 A It stops at 44.

7 Q It might be -- go a little bit closer to the
8 front.

9 A Okay, yes.

10 Q Got it? Okay.

11 So you can see this is dated November 19,
12 1973; right?

13 A Yes.

14 Q And its subject is Pooley's Response to the
15 Proposed FDA Optical Method for Detection of Asbestos
16 in Talc; right?

17 A That's the title, yes.

18 Q Okay.

19 Now we can go to the page, if you will,
20 marked 8235.

21 A Okay.

22 Q All right.

23 That's the one that at the top says 1-2;
24 right?

25 A Yes.

FY: 1974	DATE: 9/6/73	PPE USE ONLY 00679
Program: COSMETICS		Subprogram: Aerosols & Hair Preparations
Project Title: Asbestos and Other Contaminants in Talc		Project Manager & Mailing Symbol: John Stuart (BF-446)

Statement of Objective: Develop one or several methods of sufficient sensitivity and reliability which will permit the determination of asbestos and other contaminants in talc-containing products with the necessary degree of accuracy and at concentrations at which such contaminants present a potential health hazard.

Justification: The inhalation of certain asbestiform minerals is a known health hazard. The results of the determination of asbestos by x-ray diffraction in 200 commercial cosmetic talc samples by consultant to the FDA were in disagreement with those obtained by others through microscopy. This project will provide the in-house capability to perform reliable asbestos analyses and resolve the controversies on the asbestos content of the 200 commercial talc samples.

Description of Work: The 200 commercial cosmetic talc samples evaluated by Dr. Lewin will be tested for asbestos by refractory optical microscopy. After installation of the automated x-ray powder diffractometer and the high-temperature differential thermal analyzer, instrumental analytical methodology will be perfected to a degree that asbestos can be determined reliably and speedily at concentrations of less than one percent. The perfected methods will be published.

MILESTONES:

1. Evaluation of Talc Samples by Optical Microscopy
2. Installation of High Temperature Thermal Analyzer
3. Installation of x-ray Diffractometer
4. Establishment of Analytical Method
5. Analysis of Talc Samples by Instrum. Method

Quarter			
First	Second	Third	Fourth
x	x		
	x		
		x	
			x

TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

1. Program COSMETICS	2. Sub-Program Aerosols and Hair Preparations	3. Quarter/FY 1st FY 74'
4. Project Title Asbestos and Other Contaminants in Talc		5. Project Number 00679
<p>6. <u>Description of this Quarter's Activities:</u> (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper).</p> <p>The objective of this program is to develop one or several methods of sufficient sensitivity and reliability which will permit the determination of asbestos and other contaminants in talc-containing products with the necessary degree of accuracy and at concentrations at which such contaminants present a potential health hazard.</p> <p>This 1st quarter efforts have been directed to establishing a good technical base for meeting the program objectives.</p> <p>As a first milestone, the installation of the High Temperature Differential Thermal Analyzer was scheduled for completion. This has been accomplished. Further, the X-Ray Diffractometer has arrived and arrangements are underway for its installation.</p> <p>Procedures are being set up for making a rough estimate of the amount of talc powder inhaled by an infant during powdering.</p> <p>A literature and technical review of Serpentine, Amphibole and Talc mineralogy is in progress. For This purpose, the work of Lewin, on the examination of asbestos in 200 talc products has been reviewed. A trip was made to the Smithsonian Institution to examine types of the above minerals and arrange for the use of facilities.</p> <p>7. <u>Milestones Not Achieved:</u> (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).</p> <p style="margin-left: 40px;">Milestones not achieved: NONE</p>		
<p>8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (if no, explain)</p>		
<p>9. Project Manager's Signature and Mail Symbol</p> <p><i>John W. Stuart</i> John (Stuart, BF-446</p>	<p>10. Date</p> <p>9/26/73</p>	<p>11. Program Manager's Signature</p> <p><i>Heinz J. Eiermann</i> Heinz J. Eiermann, BF-440</p>
		<p>12. Date</p> <p>9/26/73</p>

CONTINUATION OF ITEM #6

Program: COSMETICS

Sub-Program: Aerosols and Hair
Preparations

1st qtr. FY 74'

Project Title: Asbestos and Other Contaminants in Talc Project Number: 00679

Techniques are being developed for concentration of the asbestos fraction of talc products to be examined. Among these are the use of heavy liquids for density separations. This kind of approach may lead to a lessening of the requirements for instrumental sensitivity while maintaining detection sensitivity.

Efforts in the next quarter will continue in the areas outlined above. Also, Lewin's "talc samples" will be examined by optical microscopy and crystallography.

TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

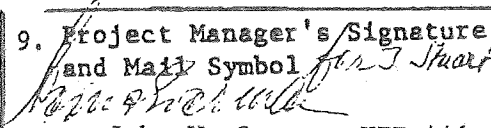
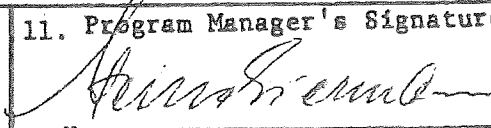
Program COSMETICS	2. Sub-Program Aerosols and Hair Preparations	3. Quarter/FY 2nd FY 74
4. Project Title Asbestos and Other Contaminants in Talc		5. Project Number 00679
<p>6. <u>Description of this Quarter's Activities:</u> (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper).</p> <p>The objective of this program is to develop methods of sufficient sensitivity and reliability to permit the determination of asbestos and other contaminants in talc-containing products with the necessary degree of accuracy and at concentrations at which such contaminants present a potential health hazard.</p> <p>The necessary equipment for the talc inhalation study has been received. Experimental work for the purpose of estimating the amount of talc powder inhaled by an infant during powdering will commence shortly.</p> <p>The differential thermal analyzer has been performance-checked and standardized. As of 12/21/73 approximately 50 thermograms (including 18 talc samples which Dr. Lewin had investigated) were prepared and analyzed. No asbestos minerals were detected.</p> <p>No investigational samples of commercial talc products were analyzed by DTA and optical microscopy. No asbestos minerals were detected.</p> <p>The literature and technical review of serpentine, amphibole and talc mineralogy is continuing.</p> <p style="text-align: right;">(Continued on next page)</p>		
<p>7. <u>Milestones Not Achieved:</u> (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).</p> <p>Installation of x-ray diffractometer has been delayed. GSA did not make the necessary utilities installation. The other project phases are essentially on target.</p>		
<p>8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (if no, explain)</p> <p>The FY 74 plan has been changed from 1.1 to 1.3 POS to reflect increased activity in the future.</p>		
9. Project Manager's Signature and Mail Symbol <i>Ronald L. Tate for</i> John Stuart HFF-446	10. Date 1/2/74	11. Program Manager's Signature <i>Heinz J. Eiermann</i> Heinz J. Eiermann HFF-440
		12. Date 1/3/74

Examination of talc samples by optical microscopy according to the method published in the Federal Register (39 FR 27076) is proceeding. As of 12/21/73, samples (Lewin's identification) # 29, 58, 60, 84, 87, 131, 133, 134, 135, 136, 137, and 138 were analyzed for mineral content. All contained large quantities of talc, small amounts of carbonates, and minor amounts of hematite, quartz and diatomaceous earth. Sample # 84 contained 107 fibers of tremolite/actinolite per mg. Sample # 87 contained 66 fibers per mg.

Standard slides were prepared with 1% and 0.1% tremolite and chrysotile in talc. Tremolite is readily detectable to 0.1%. Detection of chrysotile at the 0.1% level is questionable. Less than one in 20 fibers are visible at 400X. This evaluation was made using Congo Red dye which preferentially stains the chrysotile fibers.

TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

1. Program Cosmetics	2. Sub-Program Aerosols & Hair Preparations	3. Quarter/FY 3rd/FY 74
4. Project Title Asbestos & Other Contaminants in Talc		5. Project Number 00679
<p>6. <u>Description of this Quarter's Activities:</u> (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper).</p> <p>The objective of this program is to develop methods of sufficient sensitivity and reliability to permit the determination of asbestos and other contaminants in talc-containing products with the necessary degree of accuracy and at concentrations at which such contaminants present a potential health hazard.</p> <p>A study was undertaken to determine the amount of talc an infant may inhale when powder is applied to the child during diaper change. The use conditions were simulated and exaggerated to obtained data reflecting the most severe circumstances. Baby talc was sprinkled onto a platform at a rate of 200g per approximate half hour, and air was sucked through a filter fitted with a pre-weighed filter paper at a rate of 0.5 liters per minute reflecting approximate respiration rate of a child. The air filter funnel was positioned in such a way that it would be located near the mouth of the child under actual use conditions.</p> <p>A total of 24 experiments of dispensing 200g of talc was performed. An average of $1.2 \text{ mg} \pm 0.5 \text{ mg}$ of talc was collected. The average time for dispensing the 200g of talc was $30 \text{ min} \pm 67 \text{ min}$. Considering extreme conditions (highest amount of talc dispensed during the shortest time period, both at the 95% level of confidence) and the 0.5 l/min. air flow, the amount of talc collected on the (cont.)</p> <p>7. <u>Milestones Not Achieved:</u> (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).</p> <p>Because of the delay in the installation of x-ray diffractometer and the analysis of commercial cosmetic talc samples by optical microscopy, establishment of the analytical method for determination will be delayed beyond the fourth quarter.</p>		
<p>8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (if no, explain)</p>		

9. Project Manager's Signature and Mail Symbol  John W. Stuart HFF-440	10. Date	11. Program Manager's Signature  Heinz J. Eiermann HFF-440	12. Date MAR 28 1974
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filter would be 0.275×10^{-3} mg/ml.

Taking into consideration OSHA standards for permissible levels of asbestos fiber contamination of air (29 CFR 1910.93a) of 5 fibers / ml air on a continuous basis (8 hours per day per 5-day week) and 10 fibers / ml air as temporary exposure (15 min. per hour per 5-hour day per 5-day week) and assuming that the difference of 5 fibers per ml air may be inhaled by an infant, and furthermore considering the equation that 1000 fibers are equivalent to 0.1% of 1 mg of talc, the following condition exists: The 5 fibers per ml of air is equivalent to 5×10^{-6} mg of asbestos / ml air. Consequently, the 275×10^{-6} mg of talc may contain 5×10^{-6} mg asbestos, which is equivalent to 1.8%.

Since the OSHA standard permits inhalation of up to 10 fibers of asbestos per ml air which is equivalent to 10,000 fibers (or 10×10^{-3} mg) per liter, of 10×10^{-6} mg asbestos per ml, the maximum asbestos fiber concentration may be 3.6%. Using a safety factor of 100 would reduce the allowable level of asbestos to 0.036%. In essence this may be interpreted to mean that talc used for cosmetic purposes should contain less than 0.036% (360 fibers/mg) asbestos fibers and that analytical methodology to be developed for regulatory purposes should be sufficiently sensitive to detect asbestos in talc at this level.

On the other hand, applying OSHA standards somewhat more liberally and being primarily concerned about the maximum total daily intake of asbestos fibers, and not so much about the maximum exposure of 10 fibers/ml at any time, one may extrapolate that OSHA permits an exposure time of $10 \times 5 = 75$ min. per day to the excess amount of 5 fibers/ml. Since the infant is exposed to talc approximately 10×1 min. per day, the 1.8% asbestos level may be increased to $1.8 \times 70/10 = 13.5\%$. With a safety factor of 100, the allowable level of asbestos fibers would be reduced to 0.135% (1350 fibers/mg).

The examination by optical microscopy of the commercial cosmetic talc samples which Dr. Lewin had tested by x-ray diffraction was continued. The following samples were analyzed according to the proposed method published in the Federal Register (39 FR 27076): #61, 88, 89, 90, 92 and 93. Our determination showed that all contained tremolite (amphibole) but none showed chrysotile. With the exception of sample #61 which was found to be free of asbestos fibers, Dr. Lewin reported 4 - 5% chrysotile and 3 - 5 % tremolite. Because the fiber count for a given weight percentage of tremolite varies significantly, it is impossible to establish accurate correlation between fiber count and weight. It may, however, be stated that the high counts of tremolite observed in these samples appear to confirm the results Dr. Lewin reported for this type of asbestos fiber.

The x-ray diffractometer has finally been installed. Work on the development of a method for the determination of asbestos with this instrument, however, has been delayed because of the analysis of some of the Lewin samples by optical microscopy.

Two commercial talc products were analyzed for mineral and asbestos content by optical microscopy. No chrysotile was detected, however, tremolite (amphibole) was found in one sample at a level of 1,100 fibers/mg.

TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

Program COSMETICS

2. Sub-Program Aerosols and
Hair Preparations

3. Quarter/FY
4th/74

4. Project Title

Asbestos and Other Contaminants in Talc

5. Project Number

00679

6. Description of this Quarter's Activities: (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper).

The object of this program is to develop methods of sufficient sensitivity and reliability to permit the determination of asbestos and other contaminants in talc-containing products with the necessary degree of accuracy and at concentrations at which such contaminants present a potential health hazard.

The examination by optical microscopy of the commercial talc samples which Dr. Lewin had analyzed by x-ray diffraction was continued. As of 6/14/74 the following samples were analyzed according to the proposed method published in the Federal Register (39 FR 27076): 26, 37, 42, 63, 70, 71, 72, 74, 77, 80, 85, 94, 95, 99, 100, 101, 107, 143, 144, 145, 148, 149, 151, 152, 153, 154, 163, and 164. DCST's results by optical microscopy tend to confirm in a general way, Dr. Lewin's findings for tremolite. Chrysotile, however, which was reported in samples 95, 143, 145, 163, and 164 could not be detected by optical microscopy by DCST.

As of 6/14/74, four collaborative and two commercial samples were also analyzed for asbestos fibers by optical microscopy.

Statistical analysis of the talc inhalation data reported in the (continued)

7. Milestones Not Achieved: (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).

Milestones Not Achieved:

Although the x-ray diffractometer was installed during the third quarter FY 74, it is presently malfunctioning. Development of x-ray analytical method will commence when instrument is repaired.

8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions.
☒ Yes ☐ No (if no, explain)

9. Project Manager's Signature and Mail Symbol

Ronald L. Yates
Ronald L. Yates HFF-446

10. Date

7/5/74

11. Program Manager's Signature

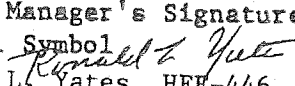
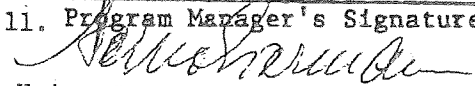
Heinz J. Elermann
Heinz J. Elermann

12. Date

HFF-440

third quarter FY 74, suggested that further data be accumulated to arrive at statistically significant conclusions concerning talc concentration in air. At the suggestion of the Division of Mathematics, DCST has obtained 30 additional sets of data. Regression and correlation analyses will now be carried out to determine the degree of dependence of experimental variables.

TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

1. Program Cosmetics	2. Sub-Program Chemical Analysis and Methods Development	3. Quarter/FY 1/75
4. Project Title Determination of Asbestos in Talc		5. Project Number 00679
<p>6. <u>Description of this Quarter's Activities:</u> (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarter. If more space is needed, use blank paper).</p> <p>The purpose of this project is to develop one or several methods of sufficient sensitivity and reliability which will permit the determination of asbestos and other contaminants in talc-containing products with the necessary degree of accuracy and at concentrations at which such contaminants present a potential health hazard.</p> <p>Work started on a method for the determination of chrysotile in talc by differential thermal analysis (DTA). Pure talc samples were spiked with various levels of chrysotile. DTA data on these samples indicate a lower detection limit of 0.5%. For a series of samples containing the same concentration of chrysotile neither the endotherms nor the exotherms were of equal intensity. This indicates that the accurate determination of chrysotile will depend upon measurement of peak areas.</p> <p>As of September 25, 3 compliance program surveillance (CPS) samples and one consumer complaint sample were analyzed for asbestos by optical microscopy. One CPS sample contained 1,100 tremolite fibers/mg. Asbestos was not detected in the remaining samples.</p>		
<p>7. <u>Milestones Not Achieved:</u> (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).</p> <p>No milestones were scheduled for completion during 1st quarter/FY 75.</p>		
<p>8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (if no, explain)</p>		
<p>9. Project Manager's Signature and Mail Symbol  Ronald L. Yates, HFF-446</p>	<p>10. Date 10-4-74</p>	<p>11. Program Manager's Signature  Heinz J. Eiermann (HFF-440)</p>
<p>12. Date 10/10/74</p>		

TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

1. Program COSMETICS	2. Sub-Program Chemical Analysis and Methods Development	3. Quarter/FY 2nd/75
4. Project Title Determination of Asbestos in Talc		5. Project Number 00679
<p>6. <u>Description of this Quarter's Activities:</u> (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper).</p> <p>The purpose of this project is to develop one or several methods of sufficient sensitivity and reliability which will permit the determination of asbestos and other contaminants in talc-containing products with the necessary degree of accuracy and at concentrations at which such contaminants present a potential health hazard.</p> <p>Work continued on the development of a method for the determination of chrysotile in talc by differential thermal analysis (DTA). Although DTA is reasonably specific for chrysotile, certain minerals, such as large amounts of chlorite (ca 10%), cause problems when determining small amounts of chrysotile (0.5-1%). Efforts to remove interferences by chemical means have had limited success. Treatment of talc samples with dilute hydrochloric acid removed interfering carbonates.</p> <p>Recovery studies were done on spiked talc samples containing from 0.5 to 5% chrysotile. Exotherm intensities were not as reliable as peak areas for quantitative calculations. Recoveries were approximately \pm 20% of true values.</p> <p>Samples of chrysotile from 10 different geographic locations were examined by DTA. (continued next page)</p>		
<p>7. <u>Milestones Not Achieved:</u> (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).</p> <p>No milestones were scheduled for completion during 2nd quarter/FY '75.</p>		
<p>8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (if no, explain)</p>		
9. Project Manager's Signature and Mail Symbol Ronald L. Yates (HFF-446)	10. Date 11/7/75	11. Program Manager's Signature Heinz J. Eiermann (HFF-440)
		12. Date 11/7/75

2.66

It was found that there was wide variation in the intensities of the dehydroxylation endotherm and the recrystallization exotherm from sample to sample. These results are not unexpected because chrysotile, being a mineral, varies slightly in composition and crystalline structure. This would mean that any quantitative results obtained would be suspect because the chrysotile in the sample would not necessarily relate to the calibration standard in a chemical and structural context.

The CTFA submitted three more round-robin samples of talc for chrysotile analysis by DTA and optical microscopy. By DTA, sample A contained in excess of 5% chrysotile, sample B contained 1% and in sample C chrysotile was not detected. Analysis by optical microscopy has not been completed.

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TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

1. Program Cosmetics

2. Sub-Program Chemical Analysis
and Methods Development

3. Quarter/FY
3rd/75

4. Project Title

Determination of Asbestos in Talc

5. Project Number

00679

6. Description of this Quarter's Activities: (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper).

The purpose of this project is to develop one or several methods of sufficient sensitivity and reliability which will permit the determination of asbestos and other contaminants in talc-containing products with the necessary degree of accuracy and at concentrations at which such contaminants present a potential health hazard.

Work is continuing on a method for the determination of chrysotile in talc by differential thermal analysis (DTA). Present work involves determining at what level chlorite interferes with this determination. Preliminary data indicate that chlorite levels of 50% can be tolerated in most talc samples. In other cases, depending on the degree of grinding and purity, chlorite can interfere at levels of 15% due to shifts in the endotherms at approximately 650° and 850°C. A more definitive answer to this problem will be obtained by spiking pure talc with chrysotile and various grades of chlorite.

Zinc, calcium and magnesium stearate have been studied by DTA to determine if these compounds interfere with the determination of chrysotile in talc. The zinc and magnesium stearates do not interfere; the calcium compound is potentially troublesome. A similar study done on laboratory grade (continued)

7. Milestones Not Achieved: (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).

Insufficient progress has been made in method development due to unforeseen scientific complexities to assure completion of work during FY 4/75.

05/105%

8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions.
☒ Yes ☐ No (if no, explain)

Project Manager's Signature
and Mail Symbol
Ronald L. Yates
Ronald L. Yates, HFF-446

10. Date

4/10/75

11. Program Manager's Signature

Heinz J. Eiermann
Heinz J. Eiermann, HFF-440

12. Date

4/10/75

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- 2 -

magnesium carbonate indicates no interference from this compound. Mineral specimens of magnesium carbonate will be examined by DTA when obtained.

Nearly all commercial samples of cosmetic talc analyzed by DTA contain an endotherm at 740°C. The mineral responsible has not yet been identified.

As of 3/28/75, DTA of approximately 75 (ca. 20 during FY 3/75) of Dr. S. Z. Lewin's talc samples were analyzed for the purpose of comparing analytical data. Two samples, Lewin's #96 and #143 indicated serpentine by DTA. It has not been determined whether that serpentine is chrysotile or antigorite.

As of 3/28/75, five Field Activity Surveillance samples have been analyzed for chrysotile. None was detected.

TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

Program

Cosmetics

2. Sub-Program Chemical Analysis
and Methods Development

3. Quarter/FY
4th/75

PROJECT

Project Title

5. Project Number

Determination of Asbestos in Talc

00679

6. Description of this Quarter's Activities: (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper).

The purpose of this project is to develop one or several methods of sufficient sensitivity and reliability which will permit the determination of asbestos and other contaminants in talc-containing products with the necessary degree of accuracy and at concentrations at which such contaminants present a potential health hazard.

Work continued on development of a method for the determination of chrysotile in talc by differential thermal analysis (DTA). DTA data was obtained on seventeen minerals known or suspected to occur in talc. Data will be used to:

- 1) Identify minerals present in cosmetic talc samples.
- 2) Determine which minerals may interfere with determination of chrysotile in talc.

As of 6/27/75, 49 Field Surveillance samples have been analyzed for chrysotile. One was detected at limit of method (0.5%). Thirty-two FAS samples were analyzed for tremolite using light microscopy. None was detected.

7. Milestones Not Achieved: (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).

Insufficient progress has been made in method development due to unforeseen scientific complexities to complete project during FY 75.

8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions.
☒ Yes ☐ No (if no, explain)

Project Manager's Signature
and Mail Symbol

Ronald L. Yates, HFF-446

10. Date

7/8/75

11. Program Manager's Signature

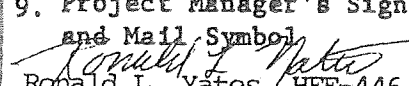

12. Date

7/8/75

TECHNICAL PLAN PROJECT DESCRIPTION

PY:	1976	DATE:	May 19, 1975	PPES USE ONLY:	00679								
PROGRAM:	Cosmetics			SUBPROGRAM: Chemical Analysis and Methods Development									
PROJECT TITLE: Determination of Asbestos in Talc			PROJECT MANAGER & MAILING SYMBOL: Ronald L. Yates (HFF-446)										
STATEMENT OF OBJECTIVE: Develop analytical methods for the determination of asbestos in talc-containing cosmetic products at concentrations of 0.1% or less.													
JUSTIFICATION: The inhalation of certain asbestiform minerals is a known health hazard. This project is expected to provide the necessary in-house capability to perform appropriate asbestos determinations and the analytical methodology for proposal of a regulation on asbestos in talc.													
DESCRIPTION OF WORK: DCST has methods for the determination of serpentine (chrysotile and antigorite) by differential thermal analysis at a level of 0.5% and of tremolite by step-scanning x-ray diffraction at a level of 0.3%. Floatation methods will be developed to concentrate serpentine and tremolite in order to be able to determine these minerals at 0.1% concentration.					TOS USE ONLY								
MILESTONES: Method for concentration of chrysotile and tremolite by floatation					<table border="1"> <tr> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> <tr> <td></td> <td></td> <td></td> <td>x</td> </tr> </table>	1	2	3	4				x
1	2	3	4										
			x										

TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

Program Cosmetics	2. Sub-Program Chemical Analysis and Methods Development	3. Quarter/FY 1st/76
4. Project Title Determination of Asbestos in Talc		5. Project Number 00679
6. <u>Description of this Quarter's Activities:</u> (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper). <p>The purpose of this project is to develop one or several methods for sufficient sensitivity and reliability which will permit the determination of asbestos and other contaminants in talc-containing products with the necessary degree of accuracy and at concentrations at which such contaminants present a potential health hazard.</p> <p>Due to separation of John Stuart from government service, no methods development investigations were done during 1st quarter/FY 76.</p> <p>DCST has continued the differential thermal analysis (DTA) of Compliance Program Surveillance samples of commercial cosmetic talcs for serpentine (chrysotile) minerals. As of 9/19/75, 28 of these samples have been analyzed. Serpentine was not detected in any samples.</p> <p>tiation of investigation to develop floatation methods for the concentration of chrysotile in talc samples will depend on manpower availability and project priorities.</p>		
7. <u>Milestones Not Achieved:</u> (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper). <p>No milestones were scheduled for completion during 1st/76.</p>		
8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if no, explain) below budget due to resignation.		
9. Project Manager's Signature and Mail Symbol  Ronald L. Yates, HFF-446	10. Date 10/3/75	11. Program Manager's Signature 
		12. Date 10/8/75

TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

1. Program Cosmetics	2. Sub-Program Chemical Analysis and Methods Development	3. Quarter/FY 2nd/76
4. Project Title Determination of Asbestos in Talc		5. Project Number 00679
<p>6. <u>Description of this Quarter's Activities:</u> (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper).</p> <p>The purpose of this project is to develop one or several methods of sufficient sensitivity and reliability which will permit the determination of asbestos and other contaminants in talc-containing products with the necessary degree of accuracy and at concentrations of which such contaminants present a potential health hazard.</p> <p>Due to lack of specialized personnel and certain necessary instrumentation, no significant work was done on methods development during 2nd quarter/FY 76. Routine analysis of consumer talc samples by differential thermal analysis (DTA) continued. Serpentine was not detected in any of these samples. Some x-ray diffraction data was obtained from talc, chrysotile and tremolite samples. The main purpose of this effort, however, was to familiarize a staff member with the operation of the computerized x-ray diffraction unit.</p> <p>Because of limited resources in regard to instrumentation and trained personnel, the only project planned relating to methods development is sample enrichment by floatation in order to detect lower levels of serpentine by DTA. Initiation of this project will depend on manpower availability and project priorities.</p>		
<p>7. <u>Milestones Not Achieved:</u> (Identify any of this quarter's milestones not met and <u>briefly</u> explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).</p> <p>No milestones were scheduled for completion during 2nd quarter/FY 76.</p>		
<p>8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if no, explain) well below budget due to resignation of principal investigator.</p>		
9. Project Manager's Signature and Mail/Phone Ronald L. Yates, HFF-446	10. Date 12/19/75	11. Program Manager's Signature Heinz J. Eiermann, HFF-440
		12. Date

TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

Program Cosmetics

2. Sub-Program Chemical Analysis
and Methods Development

3. Quarter/FY
3/76

4. Project Title

Determination of Asbestos in Talc

5. Project Number

00679

6. Description of this Quarter's Activities: (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper).

The purpose of this project is to develop one or several methods of sufficient sensitivity and reliability which will permit the determination of asbestos and other contaminants in talc-containing products with the necessary degree of accuracy and at concentrations of which such contaminants present a potential health hazard.

During the 3rd quarter/FY 76 an investigation into the use of x-ray diffraction for the detection and determination of tremolite, anthophyllite and chrysotile was initiated. The principal investigator on the project was unfamiliar with the operation of the computerized x-ray diffractometer so that several weeks of operational study was necessary. Initial talc studies were done on talc samples that had been previously analyzed by S. Z. Lewin and DCST and known to contain tremolite. Initial analytical results were disappointing. After instrument alignment and a change in the divergence slit, consistent analytical results were obtained. Quantitative values, however, differed from those reported by S. Z. Lewin. An examination of our tremolite standard by x-ray diffractometry revealed large amounts of anthophyllite and talc which probably accounts for the difference in quantitative results.

7. Milestones Not Achieved: (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).

No milestones were scheduled for completion during the 3rd quarter/FY 76.

8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions.
☐ Yes ☒ No (if no, explain) 37% - .76

Somewhat below budget due to resignation of principal investigator.

9. Project Manager's Signature
and Mail Symbol
Ronald L. Yates
Ronald L. Yates, HFF-446

10. Date

4/1/76

11. Program Manager's Signature

William C. ...

12. Date

4/4/76

6. continued:

Presently, an investigation is being conducted to evaluate the effect that divergence slits of 0.5° , 1.0° and 4.0° have on resolution, sensitivity and reproducibility. Preliminary data indicates that the 0.5° slit, at low and intermediate values of 2θ , is the slit of choice.

Future work will involve investigation in the following areas:

1. Sample preparation techniques
It is important when preparing samples for analysis by x-ray diffractometry to achieve reproducible results. Three sample preparation techniques will be evaluated.
2. Completion of investigation of the effect that different divergence slits have on resolution, sensitivity and reproducibility.
3. Investigation and analysis of selected talc samples by x-ray diffraction. Line profiles of 10 talc samples obtained from Dr. Arthur Langer of Environmental Sciences Laboratory will be run to obtain an overall qualitative picture. Selected talcs of the 76 FAS samples will also be analyzed. When suitable standards of anthophyllite and tremolite are obtained, quantitative analyses will be conducted by step-scanning through selected values of 2θ .

TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

Program Cosmetics	2. Sub-Program Chemical Analysis and Methods Development	3. Quarter/FY 4th/76
4. Project Title Determination of Asbestos in Talc		5. Project Number 00679
<p>6. <u>Description of this Quarter's Activities:</u> (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper).</p> <p>The purpose of this project is to develop one or several methods of sufficient sensitivity and reliability which will permit the determination of asbestos and other contaminants in talc-containing products with the necessary degree of accuracy and at concentrations of which such contaminants present a potential health hazard.</p> <p>The main purposes of the present investigation are two-fold:</p> <ol style="list-style-type: none">1. Determine which instrumental operating parameters and sample preparation techniques provide optimum conditions for the detection and determination of asbestos minerals by x-ray diffraction.2. Periodically analyze commercial cosmetic talc products for presence of asbestos minerals. Analyze samples that other investigators have implicated as containing asbestos minerals. <p>Investigation was completed on evaluation of the combination of divergence and receiving slits which would provide maximum sensitivity and resolution.</p>		
<p>7. <u>Milestones Not Achieved:</u> (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).</p> <p>Method for floatation concentration of chrysotile and tremolite was not completed. Project was discontinued when data obtained indicated that low levels of chrysotile could not be significantly concentrated using floatation methods.</p>		
<p>8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if no, explain)</p> <p>Somewhat below allocation due to resignation of principal investigator.</p>		
9. Project Manager's Signature and Mail Symbol Ronald L. Yates, HFF-446	10. Date 4/1/76	11. Program Manager's Signature <i>W. J. ...</i>
		12. Date

0027
4/15/74
Jm 74

6. continued

The following sets of slits were evaluated:

<u>Analytical Group</u>	<u>Divergence Slit</u>	<u>Receiving Slit</u>
Mt. Sinai	4.0°	4.0°
CTFA	1.0°	0.2 mm
FDA	0.5°	0.3 mm

The combination of 0.5° divergence slit and 0.3 mm receiving slit gave most sensitivity. Conditions recommended by CTFA were found to be nearly as good. The slit combination used by Mt. Sinai Hospital were found to give a very high background, thus requiring a much higher net count to be statistically significant. FDA analyzed by x-ray diffraction ten samples of commercial cosmetic talcs which were collected and analyzed by Dr. Langer of Mt. Sinai Hospital. Dr. Langer reported anthophyllite in five of the ten samples analyzed. FDA confirmed the presence of amphibole in these samples but identified the amphibole as tremolite in three of the samples. In addition, FDA detected anthophyllite in one sample where Dr. Langer (Mt. Sinai) reported amphibole was not detected.

Samples of standard tremolite were obtained from the U.S. Geologic Survey and Cape Asbestos Co. of London. These samples, originating in Fowler, N.Y. and South Korea respectively, were pure by x-ray diffraction. Talc standards containing 1% and 3% of the above tremolite were prepared and analyzed using the step-scan mode. A malfunction of the goniometer has prevented further study of these samples.

Different sample preparation techniques have been investigated. In our opinion the method used by Dr. Langer, where a slurry of talc is deposited on a millipore filter, is too tedious and requires a sample holder of unusual design. We have been unable to evaluate the sample preparation technique recommended by CTFA because of the present unavailability of suitable sample holders.

A number of cosmetic talc samples collected by FDA for the cosmetic surveillance program were examined by x-ray diffractometry. No amphibole or serpentine minerals were detected. Future work on this project involves activity in the following areas:

1. Preparation of standard calibration curves for the determination of tremolite, anthophyllite and chrysotile.
2. Continued study of sample preparation techniques.
3. X-Ray diffraction analysis of commercial cosmetic talcs to determine amphibole and serpentine content.

TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

1. Program Cosmetics	2. Sub-Program Chemical Analysis and Methods Development	3. Quarter/FY 5th/76
4. Project Title Determination of Asbestos in Talc		5. Project Number 00679
<p>6. <u>Description of this Quarter's Activities:</u> (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper).</p> <p>The purpose of this product is to develop one or several methods of sufficient sensitivity and reliability which will permit the determination of asbestos and other contaminants in talc-containing products with the necessary degree of accuracy and at concentrations of which such contaminants present a potential health hazard.</p> <p>The main purposes of the present investigation are two fold:</p> <ol style="list-style-type: none">1. Determine which instrumental operating parameters and sample preparation techniques provide optimum conditions for the detection and determination of asbestos minerals by x-ray diffraction.2. Periodically analyze commercial cosmetic talc products for presence of asbestos minerals. Analyze samples that other investigators have implicated as containing asbestos minerals. <p>In response to an EDRO research request, the New York District Office has offered to provide assistance in the development of analytical methods for the detection and determination of asbestiform minerals in talc. In response to their request,</p>		
<p>7. <u>Milestones Not Achieved:</u> (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).</p> <p>As stated in report for 4th/76, project to develop floatation methods for the concentration of chrysotile was discontinued.</p>		
<p>8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if no, explain) Somewhat below allocation due to resignation of principal investigator.</p>		
9. Project Manager's Signature and Mail Symbol <i>Ronald L. Yates</i> Ronald L. Yates, HFF-446	10. Date 9/30/76	11. Program Manager's Signature <i>[Signature]</i>
		12. Date

00679
5th Quarter
00679

6. DCST is preparing a number of talc samples containing known amounts of chrysotile and tremolite. These samples will be sent to the New York office by October 4, 1976.

During the 5th quarter/FY 76 most investigative work was devoted to the study of techniques for sample preparation for analysis by x-ray diffraction. The standard technique, which involves manual packing of the sample against a smooth surface, was found to give variable results in terms of sensitivity and quantitative reproducibility. These variations are caused by differences in packing density and background count. In an effort to obtain a talc sample with reproducible density, the pressed pellet technique was investigated. Talc samples containing known amounts of tremolite were prepared using pellet dies and a hydraulic press. X-Ray diffraction examination of the pelletized talc samples indicated the technique was superior to the standard method in respect to limit of detectability and reduced background count. On one sample tremolite was detected at the 0.1% level. On another sample containing 0.1% tremolite a net count was obtained but was not statistically significant; that is, net count did not exceed $2\sqrt{N}$, where N = background count.

The main disadvantages of the pellet method are preferred orientation and 2θ shifts of the tremolite peak. Preferred orientation, which is nonrandom alignment of crystals, causes errors in quantitative measurements. Shifts in 2θ values are due to a decrease in crystal lattice d spacing which, in our opinion, is caused by high hydraulic pressure. The shift in 2θ values places the main diffraction peak of tremolite in the region of anthophyllite, thus creating a potential identification problem.

Future work will involve continued investigation of sample preparation techniques, collection of statistical data, and analysis of selected FAS and consumer samples.

TECHNICAL PLAN PROJECT DESCRIPTION

PY: 1977	DATE: August 12, 1976	PPES USE ONLY: 00679											
PROGRAM: Cosmetics		SUBPROGRAM: Chemical Analysis and Methods Development											
PROJECT TITLE: Determination of Asbestos in Talc		PROJECT MANAGER & MAILING SYMBOL: Clifton H. Wilson, Ph.D., (HFF-446)											
STATEMENT OF OBJECTIVE: Develop a method to determine with the highest analytical sensitivity and accuracy asbestiform minerals in cosmetic talcs by means of x-ray diffraction. Analyze cosmetic talcs and talc products for asbestos by means of x-ray diffraction and differential thermal analysis.													
JUSTIFICATION: The inhalation of certain asbestiform minerals is a known health hazard. This project is expected to provide the necessary in-house capability to perform appropriate asbestos determinations and the analytical methodology for proposal of a regulation on asbestos in talc.													
DESCRIPTION OF WORK: DCST has methods for the determination of serpentine (chrysotile and antigorite) by differential thermal analysis at a level of 0.5% and of amphibole (tremolite) by step-scanning x-ray diffraction at a level of 0.3%. The level of detection of serpentine (chrysotile) by x-ray diffraction varies with fiber dimensions and ranges from 0.5 to 2%. DCST will investigate various sample preparation techniques and instrumental operating procedures for the determination of asbestiform minerals in talc products by x-ray diffraction. The method with the highest analytical sensitivity and accuracy will be subjected to a collaborative review study for adoption as an official analytical method for possible regulatory purposes. Samples of cosmetic talcs and talc products will be investigated by x-ray diffraction and differential thermal analysis for the determination of asbestiform minerals.					TOS USE ONLY								
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TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

1. Program Cosmetics	2. Sub-Program Chemical Analysis and Methods Development	3. Quarter/FY 1st/77
4. Project Title Determination of Asbestos in Talc		5. Project Number 00679
<p>6. <u>Description of this Quarter's Activities:</u> (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper).</p> <p>The purpose of this project is to develop a method to determine with the highest analytical sensitivity and accuracy asbestiform minerals in cosmetics talcs by means of x-ray diffraction. Analyze cosmetic talcs and talc products for asbestos by means of x-ray diffraction and differential thermal analysis.</p> <p>Investigations have been completed on sample preparation techniques and instrumental operating conditions for the x-ray diffraction detection and determination of amphibole minerals in talc. These minerals can be detected and determined at levels of 0.1%.</p> <p>After these investigations were completed, analysis of a number of standard samples were done to develop a standard calibration curve for the quantitative analysis of amphibole in talc. For this purpose, samples of talc containing 3.03, 1.05, 0.52 and 0.11% of Korean tremolite were prepared. The samples were then prepared as pressed pellets using a hydraulic press. Samples were then analyzed by x-ray diffraction. To minimize error due to preferred orientation, net counts were obtained at one position and the sample was then rotated 90° and a second net count was obtained. Two samples of each</p>		
<p>7. <u>Milestones Not Achieved:</u> (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).</p> <p style="text-align: center;">No milestones were established for this quarter</p>		
<p>8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (if no, explain)</p>		
9. Project Manager's Signature and Mail Symbol Clifton H. Wilson, HFF-446	10. Date 1/5/77	11. Program Manager's Signature 1/6/77

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3rd Quarter
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6. continued:

concentration were prepared. A minimum of eight determinations were done on each sample. These values were averaged and then plotted (Figure I). Although differences in mass adsorption coefficients between tremolite and talc would predict a non-linear plot, it is apparent from the figure that the relationship between concentration and net count is linear over the range studied. The above procedure was then repeated using a CIFA tremolite standard. Analytical data is summarized in Table I.

Ten FAS talc samples provided to Dr. Langer of Mt. Sinai Hospital for analysis are in the process of being reanalyzed in our laboratory using the proposed diffraction procedure. Dr. Langer reported that one talc sample contained approximately 1% tremolite. Our analysis of this sample using the Korean and CIFA tremolite standards indicate 1.75 and 0.65% tremolite respectively. One other talc of the group contained a trace (less than 0.1%) of tremolite. The remaining eight samples will be analyzed using the proposed procedure.

The CIFA is conducting a round robin analysis of consumer talc products and our laboratory has agreed to participate. These samples have arrived and will be analyzed during the second quarter/FY 77.

In the 5th quarter/FY 76, a number of talc samples containing added tremolite or chrysotile were sent to the New York District Office for optical microscopic analysis. The request by the New York office was in response to an EDRO research problem request. The results of their analyses have been recently received. Analysis of the data is pending.

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Table I

X-Ray Diffraction Data for Korean Tremolite Standards (Fibrous)

Trem. Conc. (%)	Count Time (Sec)	Net Count	
		Peak Max.	Peak Area
3.03	5.0	1084	6911
1.05	5.0	374	2125
0.52	7.5	325	1730
0.52	5.0	217	1153
0.11	20.0	194	600
0.11	5.0	48.5	150

CTFA Tremolite Standard (Massive)

3.14	5.0	2716	15,367
1.13	5.0	1436	7469
1.39	5.0	1446	7923
0.75	7.5	933	5276
0.75	5.0	622	3517
0.16	20.0	639	2774
0.16	5.0	160	694

TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

1. Program Cosmetics	2. Sub-Program Chemical Analysis and Methods Development	3. Quarter/FY 2nd/77
4. Project Title Determination of Asbestos in Talc		5. Project Number 0 08679
<p>6. <u>Description of this Quarter's Activities:</u> (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper).</p> <p>The purpose of this project is to develop a method to determine with the highest analytical sensitivity and accuracy asbestiform minerals in cosmetic talcs by means of x-ray diffraction. Analyze cosmetic talcs and talc products for asbestos by means of x-ray diffraction and differential thermal analysis.</p> <p>Analysis of the ten FAS talc samples mentioned last quarter was completed. One sample contained tremolite, one a trace (less than 0.1%) of tremolite and the remaining eight were free of amphiboles by x-ray diffraction.</p> <p>Our laboratory participated in a round robin analysis conducted by CTFA. Nine samples, including seven commercial talc products and two containing 0.5% tremolite and 3.5% anthophyllite were analyzed. This analysis included x-ray diffraction and optical microscopy. The analysis has been completed and results sent to the CTFA committee. Our x-ray diffractometer has better sensitivity (about 0.1%) than the CTFA method specifies. As a result, three samples were found to contain less than the 0.5% tremolite cut-off point specified in the CTFA method.</p>		
<p>7. <u>Milestones Not Achieved:</u> (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).</p> <p style="text-align: center;">No milestones were established for this quarter.</p>		
<p>8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (if no, explain)</p>		
<p>9. Project Manager's Signature <i>Ronald H. Wilson</i> and Mail Symbol HET-446 Clifton H. Wilson, Ph.D.</p>	<p>10. Date 3/29/77</p>	<p>11. Program Manager's Signature <i>[Signature]</i></p>
		<p>12. Date</p>

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Seventeen new FAS talc samples were received and eleven given a preliminary analysis (continuous scan). The results indicate the possibility of an amphibole in several samples. Nine of those eleven will be analyzed further (line-profile scan and optical microscopy). All of these samples would be completed by now except for instrument malfunction which resulted in four weeks of down time.

Future work involves further analysis of FAS samples.

TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

1. Program Cosmetics	2. Sub-Program Chemical Analysis and Methods Development	3. Quarter/FY 3rd/77
Project Title Determination of Asbestos in Talc		5. Project Number 06679

6. Description of this Quarter's Activities: (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper).

The purpose of this project is to develop a method to determine with the highest analytical sensitivity and accuracy asbestiform minerals in cosmetic talcs by means of x-ray diffraction. Analyze cosmetic talc and talc products for asbestos by means of x-ray diffraction and differential thermal analysis.

Seventeen talc products collected under the Cosmetic Compliance Program were analyzed by X-ray diffractometry and two of the products were found to contain tremolite. One of these products contained 0.1% tremolite and the other product contained trace amounts of tremolite and anthophyllite. The products containing tremolite will be examined later by optical microscopy.

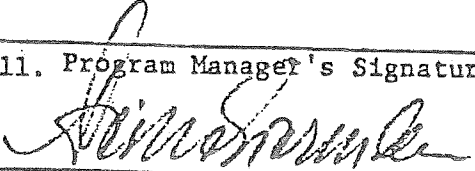
Two samples of raw talcs were also examined for asbestiform minerals. One raw talc which was scheduled to be re-packaged and sold as a cosmetic talc product was found by X-ray diffractometry to contain approximately 65% tremolite and a significant amount of anthophyllite. The presence of tremolite fibers was verified by optical microscopy.

A meeting was convened by the CIFA Talc Sub-Committee for the purpose of discussing with participants the results of their round robin analysis of coded talc samples for

7. Milestones Not Achieved: (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).

No milestones were established for this quarter.

8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions.
☒ Yes ☐ No (if no, explain)

Project Manager's Signature and Mail Symbol Clifton H. Wilson, (HFF-446)	10. Date 07/5/77	11. Program Manager's Signature 	12. Date 7/8/77
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asbestiform minerals. Results indicated major differences with the optical microscopic technique. A second round robin analysis is planned using a modified microscopic technique.

TECHNICAL PLAN
QUARTERLY PROJECT PROGRESS REPORT

Program Cosmetics	2. Sub-Program Chemical Analysis and Methods Development	3. Quarter/FY 4th/77
4. Project Title Determination of Asbestos in Talc		5. Project Number 00679
<p>6. <u>Description of this Quarter's Activities:</u> (Discuss accomplishments this quarter and indicate their significance to the program or project. Include, where relevant, the relationship of this quarter's work to that of previous and future quarters. If more space is needed, use blank paper).</p> <p>The purpose of this project is to develop a method to determine with the highest analytical sensitivity and accuracy asbestiform minerals in cosmetic talcs by means of x-ray diffraction. Analyze cosmetic talc and talc products for asbestos by means of x-ray diffraction and differential thermal analysis.</p> <p>The second round robin analysis in cooperation with CTFA Talc Sub-Committee was completed. Five samples were examined and no tremolite or anthophyllite was detected based upon the guidelines set forth in the CTFA method. One sample did contain about 0.3% tremolite.</p> <p>The dispersion staining method recommended by CTFA failed in my opinion. Comments which were forwarded to CTFA on this method included:</p> <ol style="list-style-type: none">1. The magnification of the dispersion staining device on our microscope was such that fiber size was difficult to determine since fibers meeting the definition were so small.2. Parts 1 and 5 of the definition for a fiber are very subjective and can easily vary with the analyst.		
<p>7. <u>Milestones Not Achieved:</u> (Identify any of this quarter's milestones not met and briefly explain why. Also indicate how this will affect project progress. If future milestones will not be accomplished as planned, reschedule them. If more space is needed, use blank paper).</p> <p>The milestone established for this project has been met.</p>		
<p>8. Latest RUS Report Indicates Compatibility Between Planned and Used YTD Positions. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (if no, explain)</p>		
9. Project Manager's Signature and Mail Symbol Clifton H. Wilson, Ph.D., HFF-446	10. Date 10/5/77	11. Program Manager's Signature 10/1/77
12. Date 10/1/77		

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TECHNICAL PLAN: No. 6. continued:

3. The method was slow and tedious for the type of results one obtains. It seems to me one could spend this kind of time on a scanning electron microscope and obtain more information.

The x-ray diffraction method developed in our laboratory is being prepared for publication. This will conclude work on this project.